

REMARKS

The applicant appreciates the Examiner's entry and consideration of the amendment filed July 8, 2005. Following that amendment, claims 1-14, 16-20, 25-31, 33, 34, 56, 57, 67, 68, 92, 93, 95 and 115-119 are under examination. All claims were rejected.

The claims have been amended herein to clearly distinguish them from the new cited reference, Kaye. The amendment thus places the claims in condition for allowance, and entry of the amendment is respectfully requested.

Claim 1 is amended to require the microdevice of the claim to meet one of two claim limitations: either the device must comprise a magnetic material, or the binding partner must be selected from the group consisting of a cell, a cellular organelle, a virus, and an antibody. The use of a magnetic material is supported throughout the specification, and specifically at, *e.g.*, page 15, lines 20-24. (“For example, microdevices with certain magnetic properties can be used with magnetic force. In a specific example, the microdevice can comprise one or more types of magnetic materials, such [sic] ferro- or ferri-magnetic materials in the middle of the substrate.”)

The specification describes varies binding partners that may be included in the device, for example at page 22, lines 25-31, and page 45, lines 5-7. Those specifically named include a cell, a cellular organelle, a virus, and an antibody. Thus this alternative embodiment of the claimed invention in amended claim 1 is also supported by the specification as filed.

Claims 56 and 67 have been amended similarly to require the microdevice to comprise a magnetic material, or comprise a binding partner that is a cell, cellular organelle, virus or antibody. Claim 26 was amended in view of the amendment to claim 1. Claims 13, 14 and 16 were amended to correct minor typographical or grammatical irregularities. The amendments add no new matter, and place the claims in condition for allowance as explained below. Entry of the amendment and reconsideration in light of the following comments are respectfully requested.

Claim Rejections - 35 USC § 102

Claims 1-11, 13, 16-20, 25-31, 56-57, 67-68, 92-93, 95, 115-119 were rejected under 35 U.S.C. 102(b) as being anticipated by Kaye et al (GB 2306484). According to the Examiner:

Kaye et al. teach a microdevice for combinatorial library screening. Kaye et al. teach that the micro device comprises a substrate, a photorecognizing coding pattern on said substrate, and a binding partner for binding target molecule of interest (See page 6, line 5-15; page 2, line 1-5; Figure 2 and 5). It is noted that the photorecognizable code taught by Kaye et al. consists of different shapes and forms, including hollows, grooves, or notches, which are holes not penetrating through the entire depth of the substrate (See page 6, line 5-15; Figure 2 and 5; *Particular Figure 2, second example, holes not penetrated through the substrate*) (emphasis added). With respect to the dimensions, the microdevice taught by Kaye et al. can be within from 1 to 500 microns ranges (See page 9, last paragraph). The microdevice of Kaye et al. does not comprise an anodized metal surface layer (See page 10-15; Figure 2-5).

Claim 1 has now been amended to require the claimed microdevice to comprise a magnetic material, or to have a binding partner selected from a cell, a cellular organelle, a virus, and an antibody. The two alternative limitations added to the claim are discussed individually to show that each one renders the claimed invention patentable.

The Claim Limitation Requiring the Microdevice to Comprise a Magnetic Material

The Examiner previously rejected claims 13 and 28-31 that recite magnetic materials as follows:

With respect to claims 13, 28-31, Kaye et al. also teach using electromagnetic materials for facilitation of the binding by physical force, such as magnetic interaction (See page 15, line 15-17).

A careful reading of the cited passage in Kaye, however, shows that Kaye does not teach the use of a magnetic material in its device: the reference describes instead the use of “electromagnetic radiation” to modify a material inside a device. The entire paragraph from Kaye says this:

A further embodiment of this application comprises subparticles which are derived from a non-porous, rigid, inert material such as silicate (glass) into which has been deposited, during or after production, but before association with the polymeric support, a suitable number of individual materials which can be altered by application of an external non-chemical stimulus, for example electromagnetic radiation. By virtue of the changes imbued in them by the particular stimulus, these materials can, by suitable readout of the residual deposits, reveal the process sequences that those particles/subparticles have experienced. Non-limiting examples of such materials include fluorescent and phosphorescent chemicals, which can be selectively modified by light of a specific wavelength, and also detected by a machine capable of detecting transmitted, refracted or reflected light at one or many wavelengths.

Kaye, page 15, lines 12-23.

Thus Kaye describes here the incorporation of “individual materials which can be altered by application of an external non-chemical stimulus, for example electromagnetic radiation.” That describes a subparticle having made of, *e.g.*, glass with a material built into it that can be modified by electromagnetic radiation. The materials that can be so modified “include fluorescent and phosphorescent chemicals, which can be selectively modified by light of a specific wavelength.” Thus neither the subparticle nor the material to be modified is magnetic. Moreover, the force used to modify the material is not magnetic, it is electromagnetic radiation, *i.e.* light or other photons, and the purpose of this modification is to “reveal the process sequences that those particles/subparticles have experienced”, *i.e.*, to identify a specific particle, not to manipulate it.

Nor does Kaye teach magnetic manipulation of its device or any other motivation for incorporating a magnetic material. It discloses various materials that *could* be used in portions of its device, including “metals such as aluminum or gold” among others, but states that the preferred materials are silicon and silicon dioxide. (Kaye, pg. 11, lines 18-20) Neither of these is a magnetic material, and the reference does not provide motivation to use a magnetic material. It does not appear to recognize any advantage to be achieved by doing so, and indeed states a preference for using non-metallic materials. Nor does Kaye disclose or suggest a method to use a magnetic force to manipulate its devices. Kaye thus apparently provides a device on which combinatorial chemistry can be performed, along with means to distinguish one such device from another one: it

does not seem to contemplate using a means built into the device to facilitate manipulation of the device. It does not, however, disclose a device comprising a magnetic material.

Kaye does not anticipate this limitation of claim 1 as amended, because Kaye does not disclose a device according to claim 1 that comprises a magnetic material: the only metals disclosed for making the device are non-magnetic ones, and the preferred materials are neither metallic nor magnetic. Moreover, Kaye does not provide a motivation to modify its device to incorporate a magnetic material.

The Claim Limitation Requiring the Binding Partner to Comprise a Cell, a Cellular Organelle, a Virus, or an Antibody

This claim limitation is related to the subject matter of claim 26, so the rejection of that claim is the most relevant part of the Office Action. Claim 26 allowed the binding partner to be other things, too, though, so the rejection of that claim did not have to relate to the currently named binding partners. With respect to claims 25-27, which were rejected as anticipated by Kaye, the Examiner indicates that the device in Kaye “can be used to detect enzymes or receptors. (See page 2, line 1-5).” The stated grounds for rejection of claim 26 would thus be overcome by the present amendment that limits the scope of claim 26 to specific binding partners, none of which is named in the cited portion of Kaye.

The relevant part of Kaye, then, appears to be this:

The process allows CCL’s [combinatorial chemistry libraries] containing vast numbers of “ligands” (library compounds or elements) to be created in relatively few discrete process steps, albeit with ligand present in minute quantity. By exposing the library to a biological or chemical system of interest, compounds with specific, desired chemical or pharmacological activity may be expediently identified. Such activity may include for example inhibition or stimulation of an enzyme or pharmacological receptor, the catalysis of a chemical process and the like. This technology is particularly useful when used in conjunction with high throughput screens.

Kaye, page 1, line 24 to page 2, line 6.

First, the passage which the Examiner cited does not describe the inventive device in Kaye, it is in the Background section of the application, as part of a general description of combinatorial chemistry technology. Thus it does not describe the device disclosed in Kaye at all, merely a possible end use of such a device: synthesis of combinatorial libraries. This section in Kaye describes a combinatorial library, and does not indicate that it is bound to any support. While many libraries are at least constructed on a solid support of some type, it is well known in the art to make and use combinatorial libraries that are not bound to any support, and even libraries made on a solid support are very often removed from the support before they are used for screening. (Kaye refers to “a common template or scaffold” (page 1, lines 22-23), but that is a reference to the part of the molecule that is conserved throughout members of the library, not a scaffold on which a library is built.)

Second, the cited passage does not disclose any of the binding partners of the amended claim (a cell, cellular organelle, virus or antibody), only an enzyme or pharmacological receptor. Thus it does not anticipate the limitation of amended claim 1 requiring the binding partner to comprise a cell, cellular organelle, virus or antibody.

Finally, the claims require “a binding partner that is capable of binding to a moiety to be manipulated,” while Kaye does not disclose or apparently even conceive of a moiety to be manipulated as that term is used in the claims. Since Kaye does not disclose or suggest an additional moiety that is to be manipulated by a device comprising a binding partner, it cannot disclose all limitations of the claim.

Kaye appears to provide a base on which a combinatorial library could be built, with an identification tag attached to that base. (Kaye abstract). However, Kaye does not disclose a combinatorial chemistry library, only a device on which one could be built. Moreover, Kaye does not disclose a device comprising any attached compound that could serve as a binding partner. To the extent that it describes any binding materials, it describes only the possibility of constructing small molecules or polymers on its device: that does not disclose a cell, cellular organelle, virus or antibody associated with the device. Even if an attached compound or library were disclosed, Kaye

cannot show whether anything would bind to the compound or library, it only provides a possibility that binding could occur. Thus Kaye cannot anticipate the claims as amended: anticipation requires all limitations to be disclosed exactly as they appear in the claim. (MPEP 2112 (IV): “The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic.” Citing *In re Rijckaert*, 28 USPQ2d 1955 (Fed. Cir. 1993).) A mere possibility that a relevant binding partner could bind to a compound that could be made on the device disclosed in Kaye does not inherently disclose a binding partner that ‘comprises a cell, cellular organelle, virus or antibody’.

Thus claim 1 as amended is patentable over Kaye under each of the alternatives added in the present amendment. Accordingly, all claims now pending are similarly patentable over Kaye. Withdrawal of the rejection is thus respectfully requested.

Claim Rejections - 35 USC § 103

The Claim Limitation Requiring the Microdevice to Comprise a Magnetic Material

Claims 12 and 14, which recite specific materials for use in the claimed device, were rejected under 35 U.S.C. 103(a) as being unpatentable over Kaye et al. in view of Zhou et al. (WO 0054882). These claims are now patentable over the combination of Kaye and Zhou, because Zhou does not suggest incorporating a magnetic material into the device in Kaye. The Examiner apparently already recognized this, since the combination of Kaye in view of Zhou was not applied to reject claim 13, which recites using a magnetic material in a device according to claim 11. Nor does the Examiner’s comment indicate that Zhou provides any suggestion to use a magnetic material in a device meeting the limitations of amended claim 1. However, this rejection is discussed to demonstrate that it should not apply to the claim limitation requiring the claimed device to comprise a magnetic material.

According to the Examiner,

Kaye et al. reference has been discussed but is silent in teaching use of aluminum layer or nickel alloy. [Note: Kaye at least mentions use of aluminum in certain embodiments as discussed above. See Kaye, pg. 11, lines 15-21.]

Zhou et al. teach a biochip having arrays of individual addressable microelectromagnetic units. Zhou et al. teach different materials, such as glass, silicon dioxide, aluminum, silicon dioxide or nickel alloy layers (Col. 9, line 52 to Col. 10, line 12; Col. 14, line 6065). Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to have provided Kaye et al. with the options of different substrate materials, e.g. aluminum or nickel alloy as taught by Zhou et al. since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for optimization of the result. *In re Boesch*, 617 F.2d 272; *In re Leshin*, 125 USPQ 416.

Kaye teaches a preference for non-metallic materials: Zhou does not suggest that a metal would be equivalent to or superior to the materials that Kaye describes as the preferred ones. Thus one of ordinary skill would not be motivated to modify the materials identified as 'preferred' by Kaye merely by the availability of alternative materials, since Kaye itself guides the user away from metals as a class and toward silicon or glass (silicon dioxide), and provides no motivation to use a magnetic material. It arguably would have been possible to use other materials in the Kaye device, but that is not sufficient to support an obviousness rejection: there must be a reason that one of ordinary skill *would have* made the modification, not just a showing that one *could* have. MPEP 2143.01: "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." (Citing *In re Mills*, 16 USPQ2d 1430 (Fed. Cir. 1990).

The Examiner cited *In re Leshin* and *In re Boesch* to support the contention that using the specific materials named in claims 12 and 14 would be merely a matter of 'optimization'. Even if that were true with regard to the particular materials in those claims, the same reasoning would not apply to the limitation requiring the claimed device to comprise a magnetic material. The magnetic material is instrumental in certain uses of the device, enabling it to be manipulated by a magnetic force. It materially affects the utility of the device, providing a device having an advantage that the references neither disclose nor suggest.

The cases cited by the Examiner do not appear applicable to this situation. *In re Leshin* (125 USPQ 416 (CCPA 1960)) relates to a claim to the use of a particular plastic for a device that was already known to be made of plastic: the particular plastic provided no recognized advantage,

it was described only as suitable for the intended purpose. That, the court said, was insufficient to provide a patentable distinction. However, in the case of using a magnetic material in the claimed device, that material significantly enhances the usefulness of the device, in a way not disclosed or suggested by the references.

In re Boesch (205 USPQ 215 (CCPA 1980)) relates to optimization of the composition of an alloy of specific metals according to known principles using an art-recognized result-effective variable N_v . In addition, the claim at issue was to an alloy composition range that overlapped with a composition range in the prior art. Furthermore, the claim at issue was supported by a single example, so the evidence of alleged superiority was not commensurate in scope with the claim. Accordingly, the claim was found obvious because it overlapped a known range, represented optimization according to known principles, and was not sufficiently supported by evidence of nonobviousness. The present situation is quite different from that in In re Boesch, since including a magnetic material in the claimed device involves no result-effective variable optimization, significantly changes the device, and is not suggested by any of the cited references.

Here, there is no apparent reason to depart from the preferred materials named by Kaye for making its device; and even if one of ordinary skill saw the teachings in Zhou, there is no apparent reason that one would have relied on it to modify the device of Kaye, and certainly no motivation to select a magnetic material from the various options allegedly available from Zhou. Thus even when considering materials disclosed by Zhou, there is no motivation to make any species within the claims as presently amended, requiring the device to comprise a magnetic material. Accordingly, the combination of Kaye and Zhou would not render the amended claims obvious. Withdrawal of this rejection is thus respectfully requested.

Certain claims (claims 33-34) were rejected as obvious over Kaye in view of Cattell (US 6,280,351). Cattell teaches the use of certain fluorescent markers “for increased detection efficiency”, according to the Examiner. Allegedly, it would have been obvious to use the marker from Cattell in combination with the device disclosed in Kaye “since it is well known in the art to use fluorescent label marker for detection purposes.”

This rejection is overcome by the amendment requiring the claimed device to comprise a magnetic material. That limitation is incorporated into all claims presented for consideration, and renders the claimed device patentable over Kaye. Cattell does not disclose or suggest the use of a magnetic material in a device such as that claimed; thus the combination of Kaye and Cattell does not render obvious a device having that feature, because the combination of references does not disclose or suggest at least that claim limitation. Accordingly, the combination of Kaye and Cattell does not render claims 33-34 obvious, and the applicant respectfully requests withdrawal of this rejection.

The Claim Limitation Requiring the Binding Partner to Comprise a Cell, a Cellular Organelle, a Virus, or an Antibody

The amendment to claim 1 distinguishes the claimed invention from Kaye; and neither of the additional references were applied in an obviousness analysis that related to the binding partner. The additional references cited were not directed at claim 26 or at the binding partner limitation. For completeness, the applicant points out that Kaye does not disclose a binding partner within the present claims; moreover, the mere possibility that the Kaye device ‘could be used to make a library, which could be tested while still attached to the device, and which could bind to a binding partner meeting the claim limitation’ is not sufficient to support a rejection based on inherent disclosure by Kaye. (MPEP 2112 (IV): “The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic.” Citing In re Rijckaert, 28 USPQ2d 1955 (Fed. Cir. 1993).) Thus this claim limitation is not rendered obvious by Kaye or by Kaye in combination with Zhou or Cattell.

Finally, the applicant saw no specific grounds in the Office Action for rejection of claims 67, 68 or 92, though they were listed among the claims that were allegedly anticipated by Kaye. Nevertheless, claim 67 was amended to include the limitation added to claim 1; claim 68 depends from it; and claim 92 depends from claim 1. Thus the amendment ensures that these claims are patentable over Kaye and over Kaye in combination with the other cited references.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to

withdraw the outstanding rejection of the claims and to pass this application to issue. If it is determined that a telephone conference would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

In the event the U.S. Patent and Trademark office determines that an extension and/or other relief is required, applicants petition for any required relief including extensions of time and authorize the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 471842000500. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

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